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WISSENSCHAFTLICHE KURZMITTEILUNGEN

Circadian oscillations of locomotor acitivity in *Crocidura suaveolens* (Soricidae, Insectivora, Mammalia)

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Although the daily activity pattern in Insectivors has already received much attention (e.g. VOGEL et al. 1981 and other references there), the existence of free-running rhythms has not yet been proved.

We observed and recorded the behaviour of 18 individuals of *C. suaveolens* captured in the Prague Zoological Garden and reared in the Department of Systematic Zoology in Prague from April to August 1982. The animals were kept in glass terraria sized 50 × 30 × 30 cm with a hiding place (box o 10 × 10 × 10 cm), at first at an artificial light-dark cycle (LD cycle 12 : 12 – white light, L: 0700–1900) and at natural light. Later they were exposed only to the artificial LD cycle of 12 : 12 (80 : 0 lux). Long-term variations of

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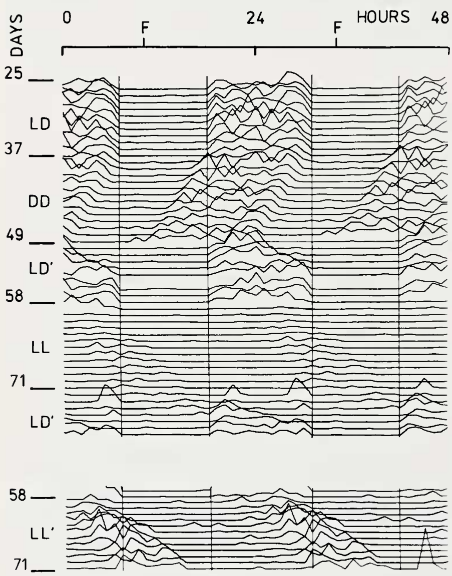
temperature in the room ranged from 20 to 26 °C, relative humidity reached 60 %–70 %. Daily variations were not recorded. The animals were daily fed, at 10 a.m. (central European time), a mixture of minced pork liver, heart, spleen and kidneys ad libidum, and mealworms. Drinking water was enriched with B-complex vitamins per inj. once a week. The locomotor activity was observed by means of an infrared light beam (Siegmund and Kapischke 1982), registered by contours, continually recorded at one-hour intervals, and plotted by computer.

All animals observed (n = 18) were distinctly nocturnal under those conditions (Figs. 1, 2 – LD). Although there are individual variations in the results all can by reliably reproduced (Siegmund and Sigmund, in prep.). Free-running rhythms were proved by rearing non-operated animals under constant conditions, and by bilateral eye enucleation. Details of the rearing conditions are shown in illustrations.

In constant total darkness (DD) the non-operated animals developed a free-running rhythm with the period growing shorter (Fig. 1 – DD). The circadian period (τ) could not



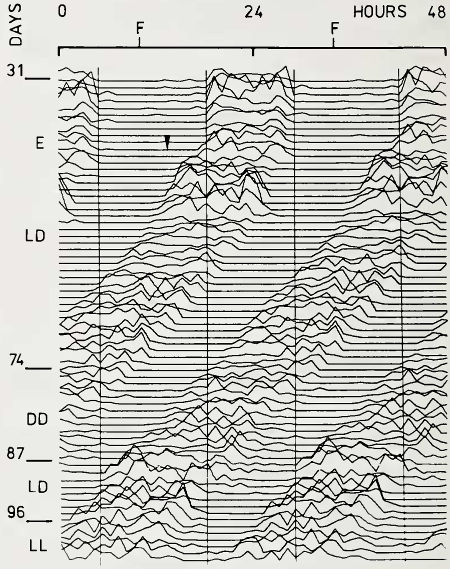


Fig. 1 (left). Locomotor activity in *Crocidura suaveolens* (No. 10 – ♂ ad, body weight = 6.7 g) in LD cycle 12 : 12 (L : 0700–1900; 80 : 0 lux) and free-running rhythm with a circadian period (τ) under constant conditions (DD, LL, F = food). The 24-hour record has been double plotted to permit visualisation of continuous 48-h spans. Recording period: May–August. τ_{DD} = 22 h 22 min. τ_{LL} = 25 h 51 min. *Fig. 2 (right).* Activity phase shifts in bilaterally blinded *Crocidura suaveolens* (No. 5 – ♀ ad, body weight = 7.0 g). The time of enucleation of eyes is indicated by ▼.

be accurately determined only in one pregnant female. When DD conditions were over the female had three young aged about 9 days.

At constant illumination (LL, 80 lux) the period was growing longer, so that circadian periods of all observed animals (n = 7) differed from the periods in DD, with individual distinctions. These results are in accordance with the circadian rule formulated by Aschoff (1960). The amount of locomotor activity diminished at constant illumination (Fig. 1 – LL). The values of locomotor activity at LL are once more graphically represented in a more suitable scale (Fig. 1 – LL) to show the full difference in free-running under the LL and DD conditions.

The bilateral eye enucleation (n = 7) always affected the experimental animals in the same way as constant darkness affected the healthy ones, disregarding light conditions (Fig. 2). These results indicate that in *C. suaveolens* the locomotor activity is synchronized with the light-dark cycle most probably through the eyes. The conclusions should by verified in other Soricids by further experimental morphological studies (SIGMUND and SIEGMUND, in prep.).

The free-running rhythm recorded in non-operated animals under constant conditions could by switched to a 24-hour rhythm shortly after an introduction of the "Zeitgeber" cycle (Fig. 1 – LD'). For a short time there was a conspicuous oscillation in the locomotor activity, connected with re-entrainment of the experimental animals. Control animals always remained synchronized with the LD cycle; daily feeding did not act as a "Zeitgeber" at all.

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Vocal communication in the megachiropteran bat *Rousettus aegyptiacus:* Development of isolation calls during postnatal ontogenesis

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Mutual acoustical communication between mother and infant during parental care is very important for the survival of the juvenile. Isolation calls (i-calls) uttered by the juvenile enable the mother to find the young separated from her. Descriptions of i-calls ("Stimmfühlungslaute" or "Verlassenheitslaute") in megachiropteran bats are given by GOULD (1979) for *Eonycteris spelaea*, KULZER (1958) for *Rousettus aegyptiacus*, NELSON (1964) for *Pteropus poliocephalus*, and NEUWEILER (1969) for *Pt. giganteus*. Subsequently it will be shown, how these calls change in the course of ontogenesis in *Rousettus aegyptiacus*.

A juvenile *R. aegyptiacus* was separated from its mother at different ages (see tab.) in order to elicite i-calls. Sounds were recorded while the young was either hand held or hanging on the wall of the cage.

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